

WASHINGTON DEPARTMENT OF ECOLOGY
ENVIRONMENTAL ASSESSMENT PROGRAM
FRESHWATER MONITORING UNIT
STREAM DISCHARGE TECHNICAL NOTES
MANUAL STAGE HEIGHT STATION

STATION ID: 45B070
STATION NAME: Icicle Creek near Leavenworth
WATER YEAR: 2007
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Introduction

Watershed Description

Icicle Creek originates in the snowfields of the eastern slopes of the central Cascade Mountain range and flows into the Wenatchee River at the City of Leavenworth. The watershed is bounded by both the Stuart Range and the Chiwaukum Mountains. Land cover above the gage consists of predominantly coniferous forest but also includes alpine shrubland, montane grassland, bedrock/talus slopes, and riparian woodlands of the Wenatchee National Forest and Alpine Lakes Wilderness Area. Mean annual precipitation across the watershed above this gage location is 82.3 inches (U.S. Weather Bureau, 1965).

Gage Location

Observation of the manual stage height stream gaging station on Icicle Creek began on May 3, 2007. The gage is located at the East Leavenworth Road Bridge on the right bank, approximately one half mile downstream of the Leavenworth National Fish Hatchery Complex.

Table 1.

Drainage Area (square miles)	211 (USGS, 2012)
Latitude (degrees, minutes, seconds)	47° 33' 49" N
Longitude (degrees, minutes, seconds)	120° 40' 04" W
Primary Gage Index Type	Staff Gage

Secondary Gage Index Type	Tape Down
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Error Analysis

Overall Rating Error Percentage	10.1%
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Rating Table(s)

Table 2. Rating Table Summary

Rating Table No.	1		
Period of Ratings	5/2007-10/2012		
Range of Ratings (cfs)	47-9230		
No. of Defining Measurements	38		
Rating Error (%)	10.1%		

Narrative

Rating Table #1 applies to the current period of record at this station. It has evolved slightly with the addition of new measurements, but, overall, has continued to be persistent. The rating has been logarithmically extended to cover one half the lowest measured discharge and two times the highest measured discharge.

Discrete Flow Record

Table 3. Discrete Flow Record Summary

Number of Discrete Stage Readings	20	
Maximum Observed Stage (feet) and Date	8.42	06/04/2007
Maximum Predicted Discharge (cfs) and Date	3330	06/04/2007
Minimum Observed Stage (feet) and Date	1.77	09/20/2007
Minimum Predicted Discharge (cfs) and Date	63	09/20/2007
Range of Stage (feet) and Discharge (cfs)	1.77 to 8.42	63 to 3330

Narrative

Staff gage observations were made by the Chelan County Natural Resources Department on a weekly basis beginning in May 2007. Three discharge measurements were made during the observed portion of the water year, ranging from 98 to 1930 cfs. Based on continuous data collected by the USGS at Icicle Creek above Snow Creek, near Leavenworth (12458000), observations began near the height of snowmelt runoff but were not the peak discharge for the water year. This peak occurred on November 6, 2006. The peak discharge during our observed portion was a case where the staff gage was submerged. The stage observation was back-calculated from a regression of staff gage and tape-down observations made from the bridge. The regression yielded an $r^2=0.97$.

Modeled Discharge

Table 4. Model Summary

Model Type (Slope conveyance, other, none)	---
Range of Modeled Stage (feet)	---
Range of Modeled Discharge (cfs)	---
Valid Period for Model	---
Model Confidence	---

Surveys

Table 5. Survey Type and Date (station, cross section, longitudinal)

Type	Date
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Activities Completed

A tape-down reference point washer was installed on 7/25/2007 to compliment the preexisting staff plate. Prior to installation of the thin washer, the tape down was done in the same location using a sharp concrete edge of the bridge curb. No significant difference was seen between these observations.